

**Claims:**

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add  $a'$  )

5 1. A method for overcurrent protection in a superconducting cable, comprising a current detector (3,4), which is inserted in series with the cable conductor of the superconducting cable, characterized in that an electrical conductor (10) is inserted in parallel with the cable conductors of the superconducting cable (1) and the current detector (3,4).

10 2. A method according to claim 1 characterized in that the electrical conductor (10) has a higher impedance than the superconducting cable (1) when in its superconducting state.

15 3. A method according to claim 1 - 2, characterized in that the electrical conductor (10) is placed outside a cryostat (8) of the superconducting cable (1).

20 4. A method according to claim 1- 3, characterized in that the current detector (3,4) constitutes at least one superconducting piece.

25 5. A method according to any of claims 1 - 4, characterized in that the current detector (3,4) comprises a superconducting material which quenches at a lower current than the superconducting cable (7).

30 6. A method according to any of claims 1-5, characterized in that the current detector (3,4) comprises a relay or a circuit breaker e.g. fuse, a thyristor, a transistor, or similar power electronic components.

7. A method according to any of claims 1-6, characterized in that the current detector (3,4) is constituted by a current-dependent resistance.

35 8. A method according to any of claims 1 – 7, characterized in that a cold shunt (11) is inserted in parallel with the cable conductors of the superconducting cable (7).

9. A superconducting cable (1) wherein the cable conductors of the cable are connected in series with a current detector (3,4) for overcurrent detection, characterized in that an electrical conductor (10) is inserted in parallel with the cable conductors of the superconducting cable (1) and the current detector (3,4).

10. A superconducting cable according to claim 9, characterized in that the electrical conductor (10) has a higher impedance than the superconducting cable (1) when in its superconducting state.

11. A superconducting cable according to claim 9 or 10, characterized in that the electrical conductor (10) is placed outside a cryostat (8) of the superconducting cable.

12. A superconducting cable according to claim 11 characterized in that the cold shunt (8) is wound in such a way that the current in this is reduced to a minimum during normal operation.

13. A superconducting cable according to claim 9 - 12, characterized in that the current detector (3,4) comprises a circuit breaker or a current limiter, and that the circuit breaker comprises a fuse and/or high-speed power electronics.

14. A superconducting cable according to claim 9 - 13, characterized in that the current detector is constituted by a superconducting material such as YBCO or Bi 2212.